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Indian Standard

CLASSIFICATION OF MAGNETITE IRON ORE

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Indian Standard

CLASSIFICATION OF MAGNETITE IRON ORE

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CLASSIFICATION OF MAGNETITE IRON ORE

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 1 December 1986, after the draft finalized by the Ores and Raw Materials Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 This standard has been formulated as it was felt that it is important to know the broad classification of iron ores available in the country for their economic utilization in the domestic iron and steel industry and for export.

0.2.1 The classification in this standard is based on minerological composition and covers magnetite iron ore only. The classification of haematite ore has been covered in IS : 5442-1982*.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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1. SCOPE

1.1 This standard covers the classification of magnetite iron ore on the basis of its chemical and physical characteristics.

2. SUPPLY OF MATERIAL

2.1 General requirements relating to the supply of magnetite iron ore shall be as laid down in IS : 1387-1967‡.

*Classification of haematite iron ore.

†Rules for rounding off numerical values (*revised*).

‡General requirements for the supply of metallurgical materials (*first revision*).

3. TYPES

For the purpose of this standard magnetite iron ore shall be of the following important types:

a) Magnetite quartzite,

b) Associated magnetite, and

c) High grade magnetite.

3.1.1 Associated magnetite shall be further classified in following types:

a) Titaniferrous magnetite,

b) Vanadiferrous magnetite,

c) Nickeliferrous magnetite,

d) Manganiferrous magnetite, and

e) Apatitic magnetite.

4. CLASSIFICATION REQUIREMENTS

4.1 For the purpose of this standard, ores containing 7 percent and above FeO (excluding hydrated ores such as Geothite and Lepidocrocite) shall be classified as magnetite ore. Further nomenclature shall be based on the major associated mineral. The determination of FeO of Fe_2O_3 shall be done in accordance with IS : 1493-1959* and IS : 1493 (Part 1)-1981†.

4.2 Depending on the type of the ore, chemical composition, the purpose/and use, the magnetite ore shall be classified as under.

4.2.1 *Banded Magnetite Quartzite* — The ores with alternate band of quartzite or jespar and magnetite with or without haematite shall be termed as banded magnetite quartzite and banded magnetite jespar. Since they occur normally as low grade ores, classification of these low grade tores is done primarily for exploitation purposes on the basis as given in Table 1.

4.2.2 *Associated of Magnetites* — The magnetite iron ore with associated constituents may be termed as 'Associated Magnetites' depending on the association of the major predominent economic mineral after magnetite. As the chemical composition varies widely in these cases, the classification has been done based on the next major constituent after magnetite as given in Table 2.

*Method of chemical analysis of iron ores.

†Methods of chemical analysis of iron ores: Part 1 Determination of common constituents (*first revision*).

TABLE 1 CLASSIFICATION OF BANDED MANGNETITE QUARTZITE ORE

(*Clause* 4.2.1)

Sl No.	Ore Type	Physical Nature	Total Fe* Percent	Magnetic Total, Fe, Percent	Crushing Strength, MPa
(1)	(2)	(3)	(4)	(5)	(6)
i)	Soft ore	Friable	Above 40	Less than 0·3	Less than 70
ii)	Hard weathered ore	Medium hard	30-40	0·3-0·7	70-210
iii)	Fresh ore	Hard	Below 30	0·7 and above	210 and above

*Figures are indicative of the general trend.

TABLE 2 CLASSIFICATION OF ASSOCIATED MAGNETITE ORE

(*Clause* 4.2.2)

Sl No.	Nomenclature	Associated Elements	
		Element	Percent, *Min*
(1)	(2)	(3)	(4)
i)	Titaneferrous magnetite	Titanium	1·0
ii)	Vanadiferrous magnetite	Vanadium	0·5
iii)	Nickliferrous magnetite	Nickel	0·5
iv)	Manganiferrous magnetite	Manganese	0·5
v)	Apatitic magnetite	Phosphorous	1·0

4.2.3 *Classification of Magnetite Iron Ore* — Some magnetite iron ores are used directly in iron and steel making and other industries. Such ores shall be classified as given in Table 3.

TABLE 3 CLASSIFICATION OF MAGNETITE IRON ORE

Sl No.	Grade	Percent, Fe	(SiO_2 + Al_2O_3) Percent
(1)	(2)	(3)	(4)
i)	Very high	68 *Min*	4·0 *Max*
ii)	High	65 *Min*	6·0 *Max*
iii)	Medium	62 *Min*	12·0 *Max*
iv)	Low	Below 62 *Min*	Above 12·0 *Max*

Note — Typical end use of these ores are pellets/sinter for blast furnace and direct reduced (DR) process, powder metallurgy and media for coal washing.

5. SAMPLING

5.1 Representative samples of iron ore shall be drawn according to the scheme of sampling given in IS : 1405-1982*.

*Method of sampling iron ores (*second revision*).

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